

## Anaesthesia for separation of conjoined twins

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Thoraco omphalopagus type accounts for about 74% of all conjoined twins. This is the first reported case of successful separation of conjoined twins in Sri Lanka. Need of detailed preoperative assessment, multidisciplinary team approach, pre-operative meetings to collate information, formulating an agenda and developing a plan of action, organised approach to anaesthetising two individuals simultaneously and meticulous postoperative care is emphasised.

Responsibility of anaesthesia team in anaesthetizing two individual patients simultaneously is highlighted.

**Keywords:** conjoined twins, thoraco-omphalopagus, general anaesthesia

### Case history

41 year old multigravida was in labour on admission to local hospital at 37 weeks of POA, with an undiagnosed twin pregnancy. Emergency lower segment caesarean section was performed due to obstructed labour. Thoraco – omphalopagus conjoined twins with APGAR score of 10 at 1 and 5 minutes were delivered. Combined birth weight was 4.5kg. Twins were transferred to the Intensive care unit (ICU) at the Lady Ridgeway Hospital which is the tertiary referral hospital for children. They were cared for 9 months till they were physiologically stable for separation. Several multidisciplinary team meetings were conducted to plan pre-operative optimization and intra-operative management.

CT scan revealed ventral fusion from the manubrium sterni to umbilicus with shared pericardium. Cardiac catheterization revealed two separate hearts, small Patent Foramen Ovale (PFO) in twin 1(T1) and mid juxta ductal coarctation and a small PFO in twin 2(T2). There was no cross circulation. They had separate gastro intestinal tracts and hepatobiliary drainage systems. Haematological and biochemical tests were normal

At 9 months combined body weight was 13kg. T1 was estimated as 7.5kg and T2 5.5kg.



Figure 1: Twins prior to separation



Figure 2 : Twins after separation

Two teams comprised of two Consultant Anaesthetists, one Anaesthetic Registrar and two Medical Officers in Anaesthesia, general, cardiac and plastic surgeons and nurses each. All anaesthetic equipment were arranged in pairs. Anaesthetic machines were placed at head end of table on either side. Adjacent theatre was arranged for second half of surgery for one twin. Each member of the team was clearly informed regarding their role.

#### Anaesthesia

Monitoring was established with ECG, pulse oximetry, blood pressure, temperature and urine output. T1 was anaesthetised first, with i.v. propofol 20mg, morphine 0.6mg and suxamethonium 14 mg and intubated in the lateral position with size 4.0 uncuffed endotracheal tube. T2 was preoxygenated while T1 was been induced.

T2 was conscious during induction of T1. She was anaesthetized similarly with i.v. propofol 15 mg, morphine 0.5mg and suxamethonium 10mg. i.v. atracurium 2mg and i.v. morphine 0.2mg intermittent boluses were given during maintenance of anaesthesia. They were ventilated using 2 separate breathing circuits with isoflurane, oxygen and nitrous oxide. Forced air warmers and fluid warmers were used to prevent hypothermia.

Internal jugular central venous access was achieved for each. Vancomycin 15mg/kg, ceftriaxone 50mg/kg and metranidazole 7.5mg/kg were given i.v. at induction. ECG, NIBP, EtCO<sub>2</sub>, SPO<sub>2</sub>, temperature and urine output remained stable throughout.

Estimated blood loss of 250ml, roughly 150ml from T1 and 100ml from T2, was replaced with packed cells. 0.9% saline 300 and 240 cc respectively was infused to the two twins during surgery.

Incision was made on the skin bridge connecting both twins. Surgical steps included reduction of intestinal herniation, liver resection and separation of diaphragms and pericardium. Finally remainder of connecting bridge of abdominal wall was divided thus separating the twins. After separation T2 was moved to the adjacent theatre with all monitoring for completion of surgery.

Surgery lasted 7 hours. Post operative ICU care was provided.

#### **Post-operative period**

Both were weaned from ventilator on post operative day 7 after gradual complete chest closure. IV morphine 20µg/kg/hour was used for analgesia and sedation. IV N/2 saline was used as maintenance fluid. Oral feeds were initiated on post-operative day 8. Antibiotics were continued for 10 days. Post operative investigations were within normal range. Both were transferred to ward on day 18 and were discharged on day 25.

#### **Discussion:**

Conjoined twins result from incomplete fission of the primitive streak at 20 days gestation. Estimated incidence is 1:25000 to 1:100000 births; with 60% stillborn.<sup>1,2</sup> Overall survival rate is 25%.<sup>2</sup> Classified by the point of union, 74% are thoraco-omphalopagus.<sup>1</sup>

Estimated operative survival is 50% in those operated in the neonatal period, but 90% in those over 4 months of age.<sup>3</sup> Surgery was scheduled at 9 months of age in this pair for them to be relatively mature. Despite all advancements in medicine, surgical procedure of separation still carries extremely high risk and each case should be approached individually.

Anaesthesia for separation is challenging which includes identifying anatomical conjunctions with shared circulation of varying extent, difficult intubation and airway management, unusual position of twins on the table, difficult vascular access, potential blood loss and maintaining normothermia. Planning for post separation and rehabilitation should commence on admission.<sup>4</sup>

Cross circulation may result in unpredictable response to anaesthetic agents. Whole body contrast CT excluded cross circulation or organ sharing in this pair. Thus sequential intravenous induction was performed and drug doses were calculated based on estimated weight of each considering each twin as separate individuals.

Union at lower chest and upper abdomen enabled placement in lateral position. Intubation was performed in lateral position which was fortunately not difficult. We used two anaesthetic machines and ventilators. However, synchronous ventilation using Carlens (Y) adaptor has been described<sup>5</sup>.

Vigilant monitoring, meticulous attention on fluid management, ventilation, maintenance of normothermia and analgesia in this long duration surgery is important. Positive treatment outcome also depend on good organization in the operating room to enable cooperation of various specialist teams involved in the therapeutic process and strict observance of the surgical management plan prepared earlier. Delayed gradual chest and abdominal closure helped to avoid compartment syndrome and improved outcome. Use of tissue expanders pre operatively has been described.

Multidisciplinary team meetings conducted pre operatively was of immense help for the successful outcome.

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